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THE PRESENT STATUS OF BIRTH REGISTRATION IN AMERICAN CITIES AND ITS RELATION TO THE INFANT MORTALITY RATE.*

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It requires no extensive statistical research at this time to prove that infant mortality in the United States in recent years has been much reduced and that it can be still further reduced. Communities, however, are not content with this general proposition but desire to know the part they individually play in this reduction. They have their own health problems and they are interested primarily in the facts for their own localities. Cities very properly wish to know what their present infant mortality is, what the trend of that mortality has been during the last five or ten years and what they may hope to accomplish in the next few years in still further reducing their losses. These questions, as we shall see, cannot be readily answered. In this paper I propose to consider the chief limitations on our effort to determine accurately the facts of infant mortality in American cities. I shall show that many of our cities are, indeed, in no position to know the trend of their infant mortality. It must be clear to us that as scientific men we must first insist that our programs to control disease be based on reliable foundations and not on vague impressions or on statistical data subject to very serious error.

The infant mortality rate is the ratio between two figures. The first is the number of births registered in a given period (usually a calendar year); the second is the number of deaths of children under one year of age during the same period, still-births being excluded from both figures. There are other measures of infant mortality which are somewhat different; but the infant mortality rate as described is the one in commonest use in present day practice. It is obvious that this infant mortality rate is correct or incorrect in proportion to the

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accuracy of the figures which compose it. If either one or both are wrong the rate will likewise be wrong. Let us consider a few of the possibilities. If the deaths of infants under one are not all recorded, the rate will clearly be too low. Again, if the number of births is, for any reason, not completely registered the infant mortality rate will appear higher than it really is. Finally, if both deaths and births are underregistered, the rate will be wrong except in the rare instances when numerator and denominator are incorrect in the same ratio.

It must be clear, therefore, that the accuracy of the infant mortality rate and of its derivative, the trend of the infant mortality rate, depends on the completeness of registration of births and deaths. Of these two, the registration of deaths has been insisted upon longer by the communities of our country. Considerable state and municipal machinery has been put into operation for this purpose. Laws are in effective operation over a large area of the country, the so-called Registration Area for Deaths, and the interest of the communities and of physicians has been developed to make such registration of deaths more and more complete. We can assume safely that, in the great majority of the cities and states included in the Registration Area, which today comprises over two thirds of the total population of the country, death registration is practically complete. The margin of error is certainly not greater than 10 per cent. and in many cases much less.

Much more serious for our purposes is the matter of birth registration. There is as yet only the beginning of a Registration Area for Births. Adequate legal provision for birth registration exists in a number of states but in many where there is a law it is certain that the law is not enforced. Such is the general consensus of opinion of those most interested in this phase of our vital statistics.

Accordingly, during the course of the last year, we undertook a systematic inquiry into the present status of birth registration throughout the United States. To this end we wrote to the registrars and other officials of all the states and cities which have been included in the Registration Area for deaths since 1910. We asked for the number of births registered in their respective communities during each of the years since

1910. In all, about 500 inquiries were sent; replies were received from 16 states and 168 cities. We at once found it necessary to disregard the replies from the state officials; birth reporting is still a local function and it is only with reference to the cities that any inquiry can possibly be worth while. In all, we found only 144 cities whose replies were sufficiently complete to justify analysis. Fortunately, this group of cities is representative of the entire country, since it includes the larger as well as the smaller ones. In the first part of this paper I shall put at your disposal an analysis of the replies from these cities and, upon the basis of the data which they supply, attempt to estimate by a number of simple tests the accuracy and completeness of birth registration in the United States in 1915 and the preceding five years.

The first test of the accuracy and completeness of birth registration is that the number of births registered in any community in a calendar year shall be greater than the number of living children under one year old. For this test the two sets of figures for the year 1910 were available, namely, the census returns for children under one and the replies to our questionnaire giving the number of births registered during the year. We found that the births actually had exceeded the number of children under one in a large number of the cities, although the excess varied considerably from city to city. In 23 out of the 144, or in 15.9 per cent. of all the cities, however, the reverse was true—the population under one did exceed the number of births reported for the year. In all these cities the registration of births was clearly inaccurate and very probably to a high degree; in some, the births registered were certainly less than one half the true number. Table I below gives a list of the 23 cities arranged in the order of the supposed inaccuracy of their birth registration as indicated by this test. The group includes some small towns, but also a number of large cities. Thus we find Baltimore, Chicago, Jersey City, Nashville and Birmingham, Ala., with populations of over 100,000: a few others had populations between 50,000 and 100,000.

TABLE I.
CITIES WHERE POPULATION UNDER 1 YEAR OF AGE EXCEEDED BIRTHS
REGISTERED IN 1910.

City.	Population under 1 1910.	Excess over Births.	Per Cent. Excess.
Riverside, Cal.....	269	9	3.3
Baltimore, Md.....	10,239	381	3.7
Winthrop, Mass.....	190	9	4.7
Birmingham, Ala.....	2,939	162	5.5
Camden, N. J.....	2,081	123	5.9
Kearny, N. J.....	395	30	7.6
Sunbury, Pa.....	361	33	9.1
Norwood, Ohio.....	297	29	9.8
Fort Wayne, Ind.....	1,104	126	11.4
Youngstown, Ohio.....	1,954	260	13.3
Santa Cruz, Cal.....	160	26	16.3
Superior, Wis.....	872	153	17.5
Wheeling, W. Va.....	781	147	18.8
Elizabeth, N. J.....	1,902	362	19.0
Alpena, Mich.....	301	64	21.3
Nashville, Tenn.....	2,139	470	22.0
Hammond, Ind.....	548	133	24.3
Jersey City, N. J.....	6,229	1,662	26.7
East Chicago, Ind.....	654	232	35.5
Stockton, Cal.....	324	135	41.7
Chicago, Ill.....	49,073	24,705	50.3
Madison, Wis.....	474	257	54.2
Ogden, Utah.....	647	389	60.1

The second test of the accuracy and completeness of birth registration is the extent to which the birth rate varies from year to year. We should view with suspicion violent changes in the birth rate from year to year or within a few years unless a plausible explanation is at hand. Applying this test we find a number of cities where there has been a decrease between 1910 and 1915. For the most part these decreases are moderate and may very well reflect the true condition of the birth rate in the cities. In some, however, the reduction is very marked indeed. Lynn, Mass., for example, showed a birth rate in 1910 of 26.8 per 1,000; in 1914 the figure had been reduced to 22.3 and in 1915 to 22.1. Such a condition very properly raises a question as to the accuracy of the birth registration in this city in the years 1914 and 1915. In Dover, N. H., the birth rate in 1910 was 23.9; in 1914 it fell to 18.2, and in 1915 rose again to 23.7. These returns also are subject to question. More serious, however, is the fact that in a large number of cities the birth rate increased in a very suspicious manner. In some cities the birth rate in 1915 was close to or even more than twice that in 1910. A list of 8 such cities is given in the following table:

TABLE II.

CITIES WITH EXCESSIVE INCREASE IN BIRTH RATES DURING THE PERIOD 1910 TO 1915.

City.	Birth Rate per 1,000 Population.			Per Cent. of Increase, 1910 to 1915.
	1910.	1914.	1915.	
Hammond, Ind.....	19.7	33.7	32.4	64
San Diego, Cal.....	11.8	22.8	20.4	73
Trenton, N. J.....	15.8	31.1	28.0	77
Chicago, Ill.....	11.1	21.7	21.1	90
East Chicago, Ind.....	21.7	47.1	42.1	94
Stockton, Cal.....	8.1	17.0	16.1	89
Ogden, Utah.....	10.0	29.8	25.6	156
Madison, Wis.....	8.5	25.7	22.4	164

The maximum increase in the birth rate is noted in Madison, Wis., where in 1915 the birth rate was 164 per cent. higher than in 1910. Increases in birth rates as shown in the preceding table are absolutely inexplicable on the basis of a normal increase in fertility and can be explained only on the ground of improved registration. Our conclusion is, therefore, that in the cities listed above the number of births reported in 1910 was entirely untrustworthy and that birth registration had improved perceptibly in 1915. But it must not be concluded from this that the birth registration in 1915 had attained its true value in all of them.

In this connection, an examination of the data for the 144 cities as a whole will be of interest. Because of the belated arrival of some of the 1915 figures we were compelled to compare 1910 with 1914. We found that the number of births in these cities combined increased 20.7 per cent. during the interval between 1910 and 1914. The increase of the population of these cities during the same period was only 10.2 per cent. This last figure must be considered in the light of the fact that during the period the chief source of increase in the population of American cities was through immigration. As might be expected the birth rate for 1914 exceeded that for 1910, the figures being 24.7 and 22.6, respectively. Included in the 144 cities, however, are two of the largest cities in the country, namely, New York and Philadelphia, which together account for 31 per cent. of the total population of the 144 cities. A very different

condition is found in them. In New York City the birth rate in 1910 was 26.9 per 1,000 and in 1914, 26.4. In Philadelphia the two figures were 24.9 and 24.8. The two cities combined gave a birth rate of 26.4 in 1910 and 26.0 in 1914. If we eliminate them from consideration in our total we find for the residue that the birth rate has very markedly increased since 1910; it was then 20.9 and in 1914, 24.2. We are accordingly confronted with the interesting fact that in two of the largest cities of the country, where birth registration has been fairly reliable since 1910, the birth rate has decreased; in the 142 other cities, taken as a group, the birth rate has very decidedly increased. In view of the evidence already at hand we are much more likely to be concerned in these figures with an improvement of birth registration in the cities as a unit than with an increase in the birth rate.

To further satisfy ourselves as to this we correlated the increase in the birth rate in the cities between 1910 and 1914 with the condition of the birth rate in 1910. In other words, we attempted to find out by means of a more refined analysis whether a low birth rate in 1910 was in general followed by an increase in the birth rate in the four subsequent years or *vice versa*. Our findings are very clear on this point. We obtained a negative correlation of over .45. This is significant, for it shows that on the whole wherever the birth rate in 1910 was below the average, there appeared during the next four years an increase in the number of births proportionately greater than that in the population and, furthermore, that the greater the deficiency in the birth rate in 1910, the greater the proportionate increase in the birth rate after that year.

There are few who, in view of the results of the tests we have applied, will doubt the incompleteness of birth registration in 1910 or in the next succeeding year or two. We must now consider the more important question whether the birth registration of 1915 may be considered reliable. To this end we arranged our cities in the order of their increasing birth rates for the year 1915. The lowest birth rate in our list of cities was in Santa Cruz, Cal., where the rate was 10.9 per 1,000; the highest birth rate was in Chicopee, Mass., where it was 42.7. The average birth rate was 24.5. If the reader will turn to the

table in the appendix in which the birth rates of the 144 cities in 1914 and 1915 are given, he will see that the rates for many of the cities vary markedly from this average. Such variability in birth rates can hardly, I believe, be explained on the basis of climatic, industrial, or racial difference alone. The only conclusion is that many of the cities with extremely low birth rates are still far from having solved their problem of birth registration.

We can at this point apply a third test of the accuracy and completeness of birth registration, the extent to which the birth rate of a city falls below what may be considered as the minimum normal birth rate for American cities. It is difficult, at this time, to lay down a general law as to what the birth rate of American communities should be since that depends upon the constitution of the population and other economic factors. The proportion of foreign to native born is perhaps the most important factor; the age constitution and the proportion of males to females are also to be considered. However, it appears to me to be entirely justifiable to doubt the accuracy of a birth rate in any but a few of our cities which is less than 20 per 1,000 of the population. In some communities where the foreign born stock predominates a birth rate under 25 should be accepted with question. In a number of communities even a birth rate of 25 per 1,000 may be considerably below the truth. For purposes of administrative control, however, a birth rate of 20 should be considered by the health officer as a minimum and his every effort thereafter should be to raise this minimum as his machinery for checking poor registration is improved. In 1915, 32 of the cities included in the study fell below this very conservative minimum. The other tests we have applied, however, indicate that the proportion of the 144 cities with defective birth registration in 1915 is much higher than this.

The defects in present day birth registration must result in very serious embarrassment to the practical worker in the field of infant hygiene, for, as was pointed out at the beginning, incomplete birth registration exaggerates the infant mortality rate and destroys comparability between the figures for different communities. I can illustrate this point with facts for the

city of Baltimore in 1910 and thereafter. In 1910, the infant mortality rate for this city was 217.7. In 1915 the rate was 119.8, a reduction of nearly one half. This is a most remarkable showing for so short a period and, if true, it should be a source of great encouragement to the health officers and private agencies of Baltimore concerned with the control of infant mortality in that city. There are, however, a few disturbing facts which must be taken into consideration. Thus in 1910 the recorded birth rate was only 17.6 per 1,000 population; in 1915 it had increased to 23.3. This suggests that we are concerned not alone with a reduction in infant mortality, but also with the effects of improved birth registration. We find, for example, that while the population increased 4.3 per cent. between 1910 and 1915, the number of births actually increased 38.3 per cent. If we apply the birth rate of 1915 to the population of 1910 we would obtain 13,037 births as against 9,858 births which were actually registered. The infant mortality rate for 1910 on this basis would have been 164.6 as against 217.7 which is the rate quoted above. It must be evident, therefore, that the marked decrease in the infant mortality rate is not all clear gain and that a large amount of it is fictitious, being the result of improved municipal bookkeeping.

We could, in like manner, take the returns of a large number of other cities which are undoubtedly proud of their successful campaigns against infant mortality and show, like Baltimore, that much of their supposed life saving is simply a reward for their recent growing interest in birth registration. It would be highly desirable in this connection if the annual circular of the New York Milk Committee on infant mortality rates in the cities of the United States, in singling out cities for praise or blame dependent upon their low or high rates took into consideration the effect of poor birth registration on infant mortality rates. A number of the cities listed in the Milk Committee's annual report for 1915 show exaggerated rates, since the births reported are clearly underestimates. This is especially true for a number of the smaller cities.

In view of the present condition of birth registration and the resulting unreliability of infant mortality rates, what can the statistician offer as a substitute to serve until birth registra-

tion in our cities is more complete? Frankly there is no satisfactory substitute for the infant mortality rate. A number of measures have from time to time been used. Thus, the "infant death rate," which is the ratio of the number of deaths of infants to the number of living children under one, has been employed by the Census Bureau. This is, however, subject to very serious error because the number of living children under one is known approximately only for census years and is even then subject to very serious error of misstatement.

Another index is the ratio of the number of deaths of children under one to the total population of all ages as estimated for the year. This measure has the advantage that both numerator and denominator which enter into it can be made fairly accurate. It is especially useful in determining the trend of infant mortality over a short period of years in any one city. However, difficulties at once arise, when it is attempted to compare the rates of different communities with one another. Differences which may appear in such comparisons may not at all be the result of higher or lower actual mortality rates, but rather of the different birth rates in the two places. Thus, if two cities of the same size, say 100,000, have birth rates of 25 and 30, respectively, the city with the higher birth rate will have the larger number of infants born annually, 3,000, as against 2,500 in the second city. A similar infant mortality rate, say of 10 per cent., will result in 300 infant deaths in the one city as against 250 deaths in the other. The actual infant mortality rates would be the same, but the substitute measure will indicate a higher death rate in the city with the higher birth rate, 3.0 as against 2.5 per 1,000 population. Nevertheless for communities where birth registration is known to be very incomplete, the error that results from the use of this substitute index will be less than that resulting from the use of the incorrect number of births. The general principle is that when dealing with factors of error it is safer to work with large numbers than with small ones, for example, with total population than with births.

Another measure which is sometimes used in communities with poor birth registration is the percentage of infant deaths to total deaths. This ratio, like the previous one, has the ad-

vantage that the figures entering into it may be presumed to be fairly accurate. The measure, however, has the serious disadvantage of all such proportions in that it does not take into consideration the number of infants exposed. We may very well have, for example, an unusually high proportionate mortality with a low infant mortality rate; this would be the case if the general mortality rate was low. Again, a low percentage of infant mortality may occur where the actual infant mortality and the general mortality rates are both high. It is not at all difficult to present a list of cities with high infant mortality rates and low proportions, and conversely.

There is, therefore, no satisfactory substitute for the infant mortality rate. In order to have a measure of the mortality of infants, we must know of necessity the number of infants exposed to death and this means that we must have complete birth registration.

My purpose here is not so much to criticize our present shortcomings as to point out a remedy for a serious evil. Those of us who are interested in the reduction of infant mortality have no choice but to set about to build up machinery for registering officially and quickly every child born. To this end, the way is fairly clear. An adequate law for the reporting of births, the model Law for the Registration of Births, is on the statute books of a number of states. Where it is not, the first step to be taken is to have this law enacted. This would apply to the following states: Alabama, Arizona, Colorado, Delaware, Iowa, Indiana, New Mexico, Nevada, South Dakota, Oklahoma, Texas, and West Virginia. Wherever this law has been or will be enacted it must be enforced. The members of this association can be of the greatest service in this connection either as individuals or collectively to see that every birth in their communities is registered, that as physicians they do this themselves and that as citizens they uphold officials who insist on the fulfillment of the law and the exposure and arraignment of all violators.

In this campaign for the improvement of birth registration the organization with which I am connected desires to play its part. It is probably known to you that for a period of two years, the Metropolitan Life Insurance Company has been

engaged in distributing through its agency force thousands of mailing cards, for the purpose of registering births. These cards are addressed to the health officers and registrars of states and cities and are distributed by agents in the homes of policyholders where there has been a recent birth or where a birth is expected. The mother is directed to fill in the name and date of birth of the child and her own name and address and then to mail the card. As an inducement to the mother to fill out and mail the card, it calls on the health officer to send literature on child hygiene. The form of the card used is shown below.

Metropolitan Life Insurance Company
NEW YORK

Stat. Form 6
Feb. 1915

The Health Officer, 191.....
(DATE)

Dear Sir:

My baby.....
(NAME)

was born on..... 191.....
(MONTH) (DAY)

at.....
(NUMBER) (STREET) (CITY)

Please send me your literature on how to keep my baby well.

.....
(PARENT)

The Metropolitan Life Insurance Company takes this means to improve birth registration and to further infant hygiene.

The plan has proved of assistance to many state and municipal health officers. Besides enabling them to register births which otherwise would have escaped official registration, it has, by singling out those who persistently fail in complying with the requirements of the law, given them at least a partial check on delinquent physicians and midwives. If these individuals were followed up with prosecutions and fines, as Dr. Wilbur planned to do in New York State, the number of violations of the law would rapidly be reduced. We have received many communications from registrars all over the country testifying to the aid they have received through our coöperation. I am

in a position, at this time, to offer you a more extensive development of this plan. If health officers and other persons interested in the reduction of infant mortality in the several states and cities of the country will write to us, we will see that an adequate supply of the cards is distributed to our policyholders. We will, moreover, follow up this distribution to see that the interest of our field staff is maintained. We are convinced of the efficacy of the plan in improving birth registration.

It is certainly to be hoped that those interested in reducing infant mortality in American cities will concentrate their attention on the problem of birth registration. At the present time we cannot measure with any degree of accuracy, except in a few cities, the effectiveness of our program for the reduction of infant mortality. Too much, as we have seen, is taken for granted and credit is appropriated beyond measure for reductions in infant mortality that are much greater than actually have occurred. We should remove, for all time, the handicap which mars the entire field of our work. Our campaign for the next few years is clearly marked out. We should work to establish a Registration Area for Births which shall be nationwide and as accurate as it is extensive.

APPENDIX A.

REGISTERED BIRTHS AND BIRTH RATES RETURNED BY 144 CITIES IN UNITED STATES 1910, 1914, AND 1915.

City.	Number of Births.			Birth Rate per 1,000 Population.		
	1910.	1914.	1915.	1910.	1914.	1915.
Birmingham, Ala.....	2,777	3,046	3,040	20.7	18.3	17.5
Mobile.....	1,068	1,178	1,086	20.5	21.2	19.2
Alameda, Cal.....	383	414	442	16.3	15.7	16.4
Los Angeles.....	5,476	8,308	7,925	16.9	18.9	16.7
Riverside.....	260	306	278	16.9	16.7	14.6
San Diego.....	472	1,114	1,045	11.8	22.8	20.4
San Francisco.....	6,435	7,308	7,649	15.4	16.3	16.8
Santa Cruz.....	134	162	153	11.9	12.0	10.9
Stockton.....	189	436	554	8.1	17.0	16.1
Colorado Springs, Colo.....	457	432	467	15.6	13.6	14.4
Bridgeport, Conn.....	2,984	3,763	3,908	29.1	32.6	33.0
Naugatuck.....	359	325	361	28.1	23.8	26.0
New Britain.....	1,607	1,946	1,964	36.3	38.4	37.6
New London.....	485	617	680	24.6	30.0	32.7
Wilmington, Del.....	2,082	2,500	2,600	23.8	27.2	27.9
Washington, D. C.....	7,031	7,130	7,067	21.2	20.2	19.7
Jacksonville, Fla.....	1,020	1,871	1,688	17.5	26.7	23.1
Savannah, Ga.....	1,722	1,744	1,721	26.4	25.7	25.2
Chicago, Ill. (a).....	24,368	51,993	51,703	11.1	21.7	21.1
Quincy.....	879	849	1,000	24.0	23.1	27.2
East Chicago, Ind.....	422	1,215	1,145	21.7	47.1	42.1
Fort Wayne.....	978	1,749	1,564	15.2	24.2	21.0
Hammond.....	415	824	820	19.7	33.7	32.4
Indianapolis.....	4,683	5,664	5,417	19.9	21.8	20.4
Logansport.....	387	406	439	20.3	20.0	21.2
South Bend.....	1,665	1,906	1,796	30.8	29.3	26.8
Baltimore, Md.....	9,858	12,637	13,634	17.6	21.8	23.3
Cumberland.....	537	709	711	24.5	29.7	27.8
Adams, Mass.....	431	484	438	33.0	35.0	31.2
Attleborough Town.....	426	490	489	26.1	26.8	26.0
Boston.....	17,670	19,462	19,655	25.7	26.5	26.4
Chicopee.....	912	1,208	1,207	35.7	43.1	42.7
Haverhill.....	1,050	1,169	1,214	23.7	24.8	25.4
Lowell.....	2,650	2,934	2,964	24.9	26.4	26.4
Lynn.....	2,403	2,186	2,220	26.8	22.3	22.1
Melrose.....	312	333	354	19.8	19.7	20.6
New Bedford.....	3,973	3,731	3,673	40.8	33.5	32.0
Newburyport.....	321	334	367	21.5	22.1	24.2
Newton.....	826	870	903	20.7	20.5	21.0
Peabody.....	406	529	588	25.7	30.2	32.8
Quincy.....	949	1,083	1,075	28.9	29.8	28.9
Revere.....	462	714	772	25.1	33.1	34.6
Salem.....	1,260	1,187	1,046	28.7	25.3	21.9
Springfield.....	2,656	3,226	3,375	29.7	32.1	32.7
Wakefield.....	276	330	325	24.1	26.8	26.0
Watertown.....	385	481	500	29.7	33.8	34.4
Webster.....	404	414	362	34.9	32.7	28.0
Winthrop.....	181	232	218	17.7	19.6	17.8
Woburn.....	351	360	369	22.9	22.8	23.3
Worcester.....	4,060	4,855	4,691	27.7	30.8	29.2
Alpena, Mich.....	237	254	215	18.6	19.4	16.3
Detroit.....	11,509	19,164	20,917	24.5	35.6	37.7
Grand Rapids.....	2,788	3,205	3,281	24.7	26.0	26.1
Ironwood.....	478	502	522	37.1	35.5	36.1
Kalamazoo.....	805	1,022	910	20.2	22.3	19.2
Muskegon.....	617	716	780	25.6	28.1	30.3
Pontiac.....	284	453	402	19.4	27.4	23.6
Sault Ste. Marie.....	353	430	359	27.9	31.9	26.2
Duluth, Minn.....	1,877	2,080	2,170	23.8	23.3	23.6
Minneapolis.....	5,985	7,889	7,813	19.7	23.0	22.1

(a) The number of registered births in Chicago is estimated as 95 per cent. of the returns from Cook County. (See Bulletin 112 of Bureau of the Census, Mortality Statistics for 1911, p. 24, footnote 4.)

APPENDIX A—Continued.

REGISTERED BIRTHS AND BIRTH RATES RETURNED BY 144 CITIES IN UNITED STATES 1910, 1914, AND 1915.

City.	Number of Births.			Birth Rate per 1,000 Population.		
	1910.	1914.	1915.	1910.	1914.	1915.
St. Paul.....	3,964	5,195	5,290	18.4	21.9	21.9
Virginia.....	376	550	488	35.4	40.2	33.8
St. Louis, Mo. (a).....	15,663	15,306	15,018	22.7	20.8	20.1
Helena, Mont.....	304	333	334	24.2	28.9	24.9
Missoula.....	242	321	281	18.5	19.5	16.2
Lincoln, Neb.....	1,034	1,207	1,169	23.4	26.4	25.4
Berlin, N. H.....	470	465	466	39.7	35.7	35.0
Concord.....	399	402	409	18.5	18.0	18.2
Dover.....	316	242	314	23.9	18.2	23.7
Laconia.....	225	270	271	22.0	24.3	24.0
Manchester.....	2,029	2,242	2,370	28.8	29.6	30.8
Nashua.....	677	707	719	26.0	26.3	26.5
Asbury Park, N. J.....	210	190	222	20.4	14.9	16.6
Bayonne.....	1,745	2,064	2,287	31.1	31.6	33.8
Camden.....	1,953	2,444	2,484	20.6	23.9	23.8
East Orange.....	582	569	784	16.8	14.3	19.0
Elizabeth.....	1,540	2,196	2,109	20.9	26.6	24.9
Jersey City.....	4,567	7,258	7,085	17.0	24.7	23.6
Kearney.....	365	442	486	19.4	20.1	21.4
Montclair.....	436	491	523	20.1	19.8	20.5
Morristown.....	250	258	271	19.9	19.8	20.6
Newark.....	10,289	11,478	11,248	29.4	29.5	28.2
Orange.....	788	796	791	26.5	24.9	24.3
Passaic.....	2,040	2,048	1,988	36.9	30.9	28.8
Plainfield.....	497	569	644	24.1	25.0	27.7
Trenton.....	1,538	3,327	3,059	15.8	31.1	28.0
West New York.....	342	597	638	24.9	34.9	35.6
Buffalo, N. Y.....	10,008	12,612	12,683	23.5	27.8	27.5
Cortland.....	265	228	295	22.9	18.1	23.0
Dunkirk.....	583	569	522	33.6	29.0	25.9
Hornell.....	227	295	288	16.6	20.6	19.8
Hudson.....	254	289	377	22.2	23.6	30.1
Little Falls.....	352	429	488	28.6	32.8	36.8
New York.....	129,080	140,647	141,256	26.9	26.4	25.8
Niagara Falls.....	879	1,517	1,434	28.7	43.2	39.6
North Tonawanda.....	363	419	406	30.2	31.8	30.1
Plattsburg.....	219	239	227	19.6	19.4	18.1
Saratoga Springs.....	222	254	266	17.5	19.8	19.3
Schenectady.....	2,172	2,361	2,165	29.5	26.1	22.7
Syracuse.....	2,870	3,415	3,579	20.8	22.9	23.5
White Plains.....	366	545	520	22.7	28.1	25.8
Yonkers.....	2,107	2,543	2,461	26.2	27.2	25.5
Raleigh, N. C.....	463	604	556	24.1	30.5	27.8
Canton, Ohio.....	1,123	1,278	1,491	22.2	22.3	25.2
Cincinnati.....	7,263	8,080	7,803	19.9	20.1	19.2
Columbus.....	3,280	3,837	3,896	18.0	18.8	18.6
Dayton.....	2,637	2,950	2,697	22.6	23.8	21.5
Massillon.....	285	278	299	20.5	18.6	19.8
Middletown.....	306	558	602	23.1	37.6	39.5
Norwood.....	268	316	247	16.4	15.6	11.6
Sandusky.....	395	425	418	19.8	21.0	20.7
Toledo.....	3,542	4,460	4,551	20.9	24.2	24.2
Youngstown.....	1,694	2,109	2,558	21.2	22.6	24.5
Altoona, Penn.....	1,410	1,599	1,525	26.9	28.3	26.5
Carbondale.....	479	467	446	28.0	25.2	23.6
Erie.....	1,791	2,300	2,090	26.8	31.8	28.3
Harrisburg.....	1,634	1,442	1,352	25.4	20.8	19.1
Norristown.....	571	665	672	20.4	22.0	21.8
Philadelphia.....	38,676	41,063	40,849	24.9	24.8	24.3
Pittsburgh.....	15,197	16,328	16,139	28.4	28.9	28.2

(a) April to April.

APPENDIX A—*Concluded.*

REGISTERED BIRTHS AND BIRTH RATES RETURNED BY 144 CITIES IN UNITED STATES 1910, 1914, AND 1915.

City.	Number of Births.			Birth Rate per 1,000 Population.		
	1910.	1914.	1915.	1910.	1914.	1915.
Reading.....	2,496	2,670	2,511	25.9	25.8	23.3
Sunbury.....	328	377	335	23.7	24.4	21.1
Warren (a).....	230	269	297	20.6	19.2	20.6
Pawtucket, R. I.....	1,183	1,278	1,419	22.8	22.5	24.4
Providence.....	5,727	6,098	5,833	25.4	24.9	23.3
Nashville, Tenn.....	1,669	2,369	2,095	15.1	20.6	18.1
Galveston, Tex.....	685	911	940	18.4	22.6	22.9
Ogden, Utah.....	258	880	779	10.0	29.8	25.6
Barre, Vt.....	247	285	275	22.9	24.3	23.0
Rutland.....	258	302	322	19.0	20.9	22.0
Richmond, Va.....	2,734	3,155	3,473	21.4	23.4	22.5
Seattle, Wash.....	4,220	4,905	4,953	17.5	15.7	15.0
Tacoma.....	1,517	1,546	1,487	17.9	14.9	13.8
Wheeling, W. Va.....	634	830	840	15.2	19.4	19.5
Beloit, Wis.....	353	415	408	23.2	24.2	23.2
Fond du Lac.....	431	438	458	22.8	21.5	22.1
Janesville.....	274	285	287	19.7	20.1	20.1
La Crosse.....	629	720	621	20.7	23.0	19.7
Madison.....	217	757	673	8.5	25.7	22.4
Manitowoc.....	324	296	373	24.8	21.8	27.3
Milwaukee.....	9,797	11,929	11,278	26.1	28.6	26.3
Oshkosh.....	750	820	794	22.6	23.4	22.3
Racine.....	964	1,258	1,350	25.2	28.3	29.7
Superior.....	719	868	780	17.7	19.6	17.2
Total Cities.....	466,894	563,678	564,518	22.6	24.7	24.2

(a) Stillbirths included.